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PORT HOPE HARBOUR

WATER QUALITY SURVEY

1992

JUNE 1994

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Environment
and Energy

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PORT HOPE HARBOUR

WATER QUALITY SURVEY

1992

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Port Hope Harbour Remedial Action Plan

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1. BACKGROUND

Port Hope is located at the mouth of the Ganaraska River on the north shore of Lake Ontario. The harbour has been identified to the International Joint Commission (IJC) Water Quality Board as an "Area of Concern" (AoC) under the terms of the binational Great Lakes Water Quality Agreement (GLWQA) "Annex 2" (IJC 1989). Currently, a federal-provincial "Remedial Action Plan" (RAP) is being prepared. The Stage 1 RAP report describing environmental conditions and defining problems has been completed (Environment Canada and Ontario Ministry of the Environment 1989), and the Stage 2 RAP report detailing preferred options for the restoration of beneficial uses is in preparation.

The harbour is used primarily by the Port Hope Yacht Club, but also serves as a receiving water body for cooling water from CAMECO who operate a uranium conversion facility on the adjacent property. As the result of waste management practices associated with radium and uranium refining practices in Port Hope from 1933 to 1948, the harbour contains approximately 90,000 m^3 of sediment contaminated by uranium and thorium series radionuclides, heavy metals and PCBs (Environment Canada and Ontario Ministry of the Environment 1989). Until this contaminated sediment can be disposed of in a facility licensed to receive low-level radioactive waste, maintenance dredging cannot be undertaken and the resulting loss of navigational depth will eventually restrict the use of the harbour as a boat mooring facility.

Although the disposal or isolation of the contaminated sediment is the primary focus of the RAP, the shallow depth (2-3m) and sheltered nature of the harbour have been documented to result in localized water degradation (Environment Canada and Ontario Ministry of the Environment 1989). Water quality in the Turning Basin will reflect a combination of inputs to the harbour which although dominated by the cooling water discharge from CAMECO, also include storm water runoff from the surrounding urban and industrial area, and seiche-driven incursions from Lake Ontario.

From 1983 to 1988 the Central Region of the Ontario Ministry of Environment and Energy (MOEE, formerly Ontario Ministry of the Environment) undertook water quality sampling in

the Port Hope Harbour and Ganaraska River for conventional water quality tests (at the MOEE laboratory), and uranium and radium^{226} (at the Ministry of Labour laboratory). Sampling was undertaken at 8 stations on approximately 4 days per year.

These data were used in the Stage 1 RAP but in order to allow a meaningful comparison of baseline conditions with post clean-up surveillance data this survey was undertaken to update and improve upon this previous sampling effort.

2. OBJECTIVES

The 1992 water quality survey was designed to assess water quality in Port Hope Harbour with respect to Provincial Water Quality Objectives (PWQO) for a range of appropriate physical parameters, nutrients, metals. Radionuclides were also sampled for comparison with appropriate guidelines. In some cases, comparisons with Drinking Water Objectives can be made, although it must be emphasized that drinking water is drawn directly from Lake Ontario, not the harbour.

The survey was designed to facilitate a pre and post clean-up comparison of water quality and to allow a comparison of seasonal conditions.

The results will be available for the Stage 2 RAP, and will form the basis for comparison with future RAP monitoring and surveillance data.

3. SAMPLING PROTOCOLS

Water samples were analyzed for the following list of physical parameters, nutrients, and metals at the MOEE laboratory according to standard procedures (MOEE 1983):

> pH, fluoride, total phosphorus, chloride, conductivity (25°C) dissolved oxygen, ammonia, nitrite/nitrate, total Kjeldahl nitrogen, phosphate, sulphate, suspended solids, turbidity, arsenic, copper, iron, nickel, uranium.

In addition, samples were submitted for radiological analysis by the MOL Radiation Protection Laboratory for Ra^{226} and uranium (filtered).

Sampling was undertaken at the following locations at 0.5 m from the surface (see Figure 1):

Station Number	Description
06 01 2009	100 m south of Harbour entrance
06 01 2010	50 m east of Harbour entrance
06 01 2011	50 m west of Harbour entrance
06 01 2012	mid-channel confluence of Ganaraska R. and West Slip
06 01 2013	mid-channel Turning Basin entrance
06 01 2014	south west Turning Basin 50 m from cooling discharge
06 01 2015	north west Turning Basin 50 m from wall (SS)
06 01 2016	north east Turning Basin 50 m from wall (SS)

Single samples were obtained at each station 4 separate days in the spring, summer and fall. Each survey consisted of water quality sampling at 8 stations per day at 1 sampling depth only (0.5 m).

Additional sampling for QA/QC purposes was done at one randomly selected station per survey day. At this station a simultaneous replicate was obtained for submission as an extra sample (i.e. a split sample) as a check on data variability resulting from sample handling and analysis. In addition, a distilled water blank was obtained following sampling at the open lake station (06 01 2009). Distilled water was poured through the pump-hose system and submitted for metals analysis to ensure that no sample contamination by the sampling equipment was occurring.

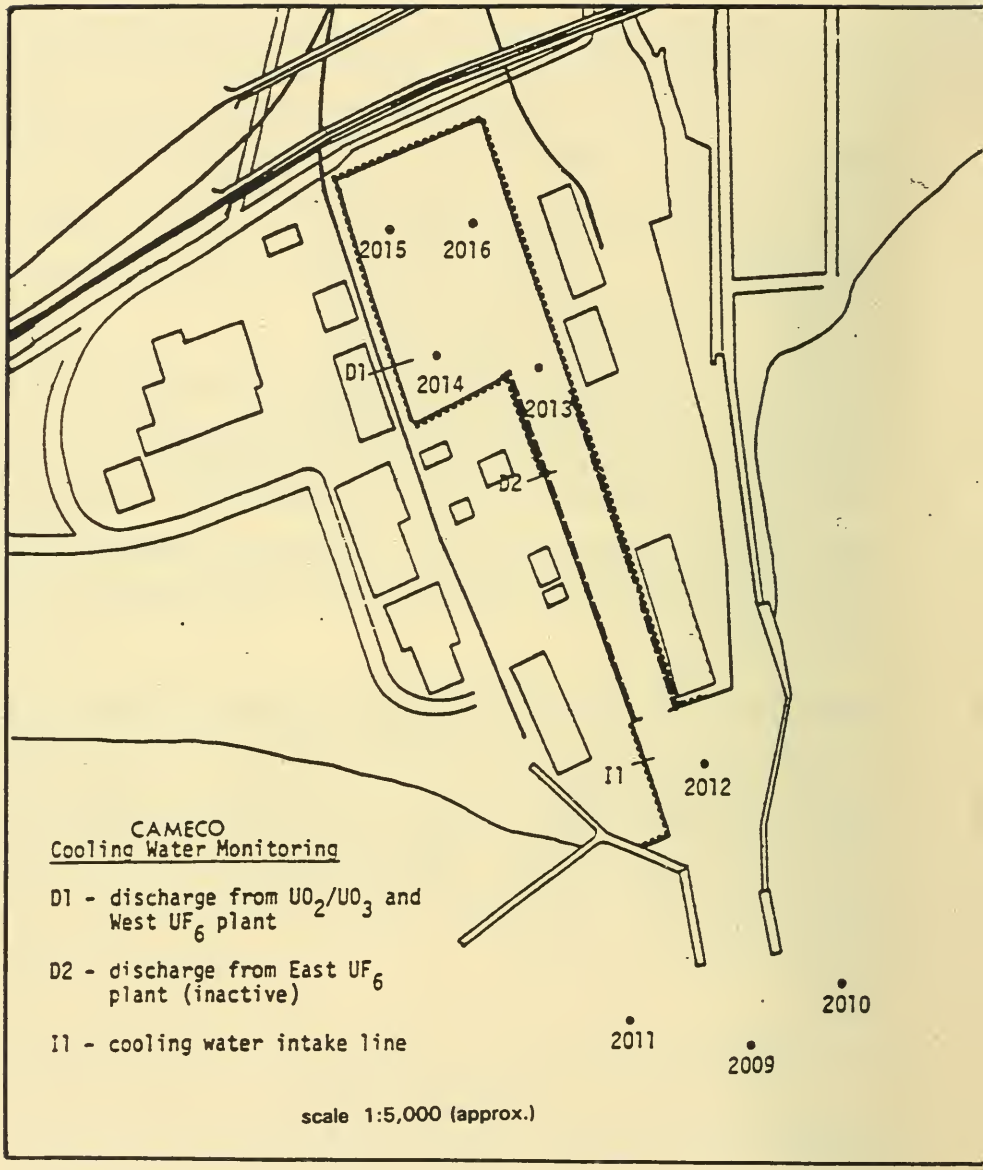


Figure 1: Study Area and Station locations

4. RESULTS

Table 1 corresponds to the data summary which appeared in the Stage 1 RAP report (shown here as Table 2). A more complete statistical summary of the 1992 results is contained in Appendix I. Appendix II contains a complete listing of all data. The 1992 data reinforce findings previously reported in the Stage 1 RAP report (Environment Canada and Ontario Ministry of the Environment 1989) regarding the gradient in water quality from the Turning Basin through the West Slip and out into Lake Ontario. Iron and total phosphorus in the Turning Basin were frequently detected in excess of the Provincial Water Quality Objectives (PWQOs) or guidelines, although neither have been previously identified as serious local concerns.

Results from 1983-1988 identified Turning Basin stations as having maximum iron concentrations of greater than 1,000 μg l-1, but being detected in excess of the PWQO (300 $\mu g\ l^{-1}$) in only 30-40% of samples. The 1992 results show maximum concentrations to have diminished by approximately a half (400-600 $\mu g\ l^{-1}$) but the frequency of detection above the PWQO to have increased (66-91%). This indicates a reduction in data variability, although the 1983 to 1988 data are insufficient to allow a quantitative comparison.

Spring and fall peaks are evident for both unfiltered total uranium (analyzed by MOEE) and for dissolved uranium (analyzed by MOL) in the Turning Basin, although concentrations never exceed half of the Drinking Water Objective of 100 $\mu g\ l^{-1}$. This seasonal pattern coincides with the summer shutdown at the CAMECO plant, and demonstrates the direct, and significant influence of the cooling water discharge on localized water quality.

TABLE 1: SUMMARY OF 1992 PORT HOPE WATER QUALITY SAMPLING RESULTS

PARAMETER	SUMMARY	SAMPLING STATIONS							
		2009	2010	2011	2012	2013	2014	2015	2016
pH (no units) PWQO: 6.5-8.5	# of samp.	11	10	10	9	11	11	9	10
	Min.	8.22	8.19	8.21	8.20	8.11	8.12	8.11	8.11
	Max.	8.37	8.36	8.34	8.40	8.26	8.23	8.23	8.38
	%>PWQO	0	0	0	0	0	0	0	0
Iron ($\mu g\ l^{-1}$) PWQO: 300	# of samp.	11	10	10	9	11	11	9	10
	Min.	20	20	20	100	270	230	200	200
	Max.	210	97	160	330	540	570	430	540
	%>PWQO	0	0	0	11	91	73	66	70
Phosphorus ($\mu g\ l^{-1}$) PWQO: 20 (guideline)	# of samp.	11	10	10	9	11	11	9	10
	Min.	6	5	10	23	51	50	61	52
	Max.	24	18	26	76	107	119	108	100
	%>PWQO	18	0	40	100	100	100	100	100
Copper ($\mu g\ l^{-1}$) PWQO: 5	# of samp.	11	10	10	9	11	11	9	10
	Min.	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Max.	1.0	2.0	2.0	1.0	4.0	3.0	8.0	3.0
	%>PWQO	0	0	0	0	0	0	11	0
Nickel ($\mu g\ l^{-1}$) PWQO: 25	# of samp.	11	10	10	9	11	11	9	10
	Min.	<2	<2	<2	<2	<2	<2	<2	<2
	Max.	<2	<2	<2	<2	<2	<2	3	<2
	%>PWQO	0	0	0	0	0	0	0	0
Arsenic ($\mu g\ l^{-1}$) PWQO: 100	# of samp.	11	10	10	9	11	11	9	10
	Min.	<1	<1	<1	<1	<1	2	2	2
	Max.	<1	<1	<1	3	7	7	6	4
	%>PWQO	0	0	0	0	0	0	0	0

PWQO: Provincial Water Quality Objectives
All results represent unfiltered total samples

TABLE 2: SUMMARY OF 1983 - 1988 PORT HOPE WATER QUALITY SAMPLING RESULTS

PARAMETER	SUMMARY	SAMPLING STATIONS							
		2009	2010	2011	2012	2013	2014	2015	2016
pH (no units) PWQO: 6.5-8.5	# of samp.	20	18	20	18	18	19	19	19
	Min.	7.95	7.91	7.91	7.99	7.66	7.39	7.67	7.57
	Max.	8.59	8.60	8.59	8.39	8.33	8.29	8.30	8.31
	%>PWQO	10	11	5	0	0	0	0	0
Iron ($\mu g\ l^{-1}$) PWQO: 300	# of samp.	28	25	27	26	26	27	26	27
	Min.	<5	<5	<5	110	75	75	65	51
	Max.	880	935	555	820	1,325	1,500	1,625	1,875
	%>PWQO	19	8	7	23	39	37	31	33
Phosphorus ($\mu g\ l^{-1}$) PWQO: 20 (guideline)	# of samp.	20	18	20	18	18	19	19	19
	Min.	8	<7	<5	19	11	15	17	19
	Max.	54	240	36	79	96	102	68	182
	%>PWQO	10	17	5	39	67	84	74	74
Copper ($\mu g\ l^{-1}$) PWQO: 5	# of samp.	20	17	20	18	18	19	19	19
	Min.	<1	1	<1	<1	1	1	1	1
	Max.	71	11	90	79	25	38	20	18
	%>PWQO	10	6	5	17	22	21	21	26
Nickel ($\mu g\ l^{-1}$) PWQO: 25	# of samp.	20	16	20	18	18	19	19	19
	Min.	<1	1	<1	<1	1	<2	1	1
	Max.	3	3	3	5	4	150	8	4
	%>PWQO	0	0	0	0	0	11	0	0
Arsenic ($\mu g\ l^{-1}$) PWQO: 100	# of samp.	20	1	1	18	18	19	19	19
	Min.	<1	1	1	<1	<1	1	1	1
	Max.	<4	1	1	5	4	1	1	1
	%>PWQO	0	0	0	0	0	0	0	0

PWQO: Provincial Water Quality Objectives
All results represent unfiltered total samples

As with uranium, the highest concentrations of Ra^{226} were observed in the Turning Basin (median of 0.037 Bql^{-1}) while the lowest were observed in Lake Ontario (median of <0.005 Bql^{-1}). Unlike uranium, though, no seasonal peaks were evident, so it would appear that the localized elevation in dissolved Ra^{226} reflects the residual effect of radioactive material in the Turning Basin rather than the active cooling water discharge. Notwithstanding this localized effect in the Turning Basin, even the maximum observed concentration of 0.066 Bql^{-1} is less than one tenth the provincial maximum acceptable concentration (MAC) for drinking water of 1.0 Bql^{-1}.

5. DISCUSSION

In order to examine data patterns more closely, a 2-way Analysis of Variance (ANOVA) was undertaken for total phosphorus, iron, and uranium, and correlation matrices were computed for selected parameters using the grouped results from open lake stations and Turning Basin stations (see Appendix I). In addition, correlations among total uranium, dissolved uranium, and dissolved Ra^{226} were computed.

The 2-way ANOVA allows a quantitative comparison of spatial variability (i.e. sampling location effects), temporal variability (i.e. sampling season effects), and the interaction between them. Table 3 summarizes the results of this procedure.

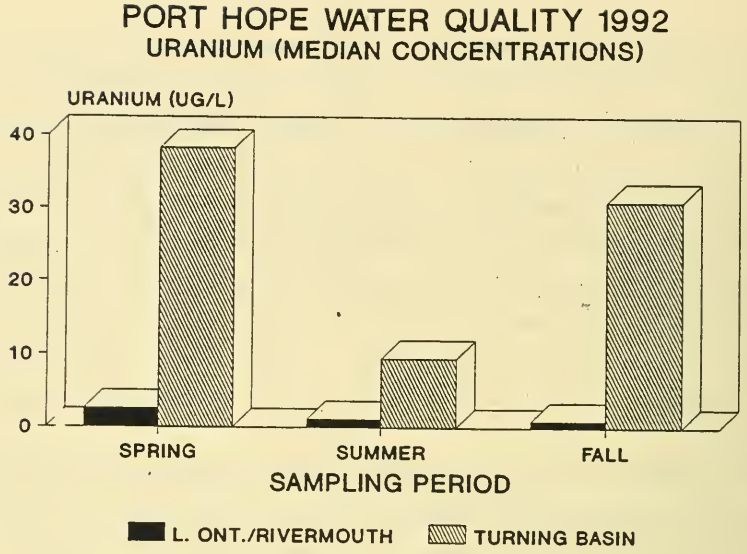
TABLE 3: SUMMARY OF 2-WAY ANALYSIS OF VARIANCE RESULTS

PARAMETER	STATION EFFECTS[1]	SEASON EFFECTS[1]	INTERACTION EFFECTS[1] (STN. VS. SEASON)
Total phosphorus	YES	NO	NO
Iron	YES	NO	NO
Uranium	YES	YES	YES

1. Significant at $p < 0.001$

All three parameters exhibit significant ($p<0.001$) station effects resulting from the high mean concentrations observed in the Turning Basin, and the relatively low concentrations found in the open lake. However, only uranium exhibits a highly significant seasonal effect, and only at Turning Basin stations (see Figure 2). As a result, uranium demonstrates significant interaction among station and seasonal effects. This interaction means that the pattern of season-to-season differences was not similar across all stations (or, conversely, that the pattern of station-to-station differences was not similar across all sampling seasons). These significant spring and fall peaks in uranium concentrations observed in the Turning Basin -- the portion of the study area most directly affected by the CAMECO discharge -- support the view that the cooling water discharge is responsible.

The unique pattern of uranium results suggests that although phosphorus and iron also show a similar spatial gradient from the Turning Basin through the West Slip into Lake Ontario, different sources are involved. This can be explored further by looking at correlations among water quality parameters (see Appendix I). Significant ($p<0.001$) correlations are evident at both the open lake and Turning Basin stations between suspended sediment and phosphorus ($r=0.7361$ and $r=0.9452$), suspended sediment and iron ($r=0.8018$ and $r=0.8868$), and phosphorus and iron ($r=0.7156$ and $r=0.8159$). These are indicative of a particulate source of phosphorus and iron and are in sharp contrast with total uranium which is poorly correlated with suspended sediment in either the open lake or Turning Basin ($r=0.4105$ and $r=0.3746$) and well correlated with conductivity ($r=0.7019$ and $r=0.7946$) and chloride ($r=0.9145$ in the Turning Basin only). Additional arguments for a separate, dissolved source of uranium are the virtually identical concentrations of dissolved and total uranium (Appendix II), and the high degree of significant ($p<0.001$) correlation between them ($r=0.9761$) at Turning Basin stations.



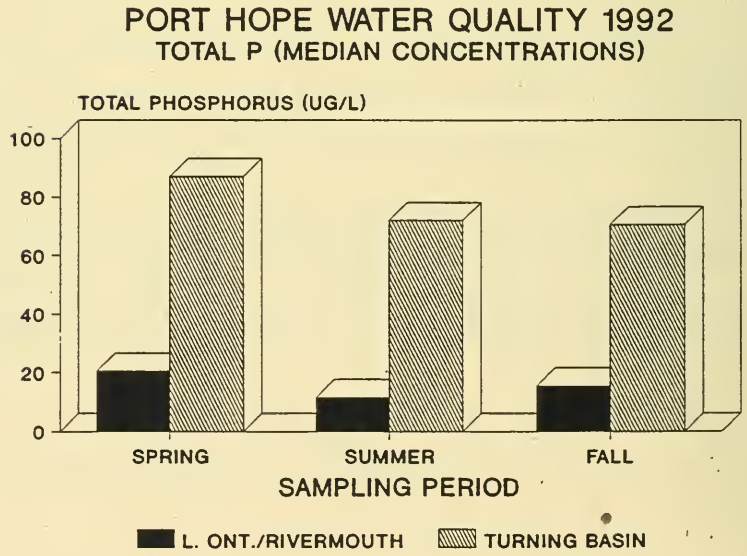


Figure 2: Seasonal Concentrations of Uranium and Total Phosphorus

Examination of correlations between Ra^{226} and other parameters supports the view that elevated Ra^{226} concentrations in the Turning Basin are not connected with the source of dissolved uranium ($r = 0.0413$), or the source of particulate iron and phosphorus ($r \leq 0.1880$).

6. CONCLUSIONS

The picture that emerges from this water quality survey can be summarized as follows:

(1) A pronounced gradient in water quality between the Turning Basin and Lake Ontario exists due to elevated concentrations of suspended solids, turbidity, conductivity, nutrients, total metals, dissolved uranium and dissolved Ra^{226} in the Turning Basin.

(2) Despite these elevated concentrations in the Turning Basin, only iron and total phosphorus exceed their respective Provincial Water Quality Objectives (or guideline) with any notable frequency. There was no evidence of any adverse effect of the Turning Basin on drinking water supplies from Lake Ontario.

(3) Spring and fall peaks in Turning Basin uranium concentrations appear to be related to cooling water flows from CAMECO but do not exceed the Provincial Drinking Water Objective of 100 $\mu g l^{-1}$.

(4) Elevated Turning Basin concentrations of iron and phosphorus do not appear to be related to CAMECO and are most probably the result of urban runoff.

(5) Increased concentrations of Ra^{226} in the Turning Basin do not exceed the Provincial Drinking Water Objective of 1.0 $Bq l^{-1}$ and do not appear to be connected with current discharges from CAMECO or urban runoff; they may represent a residual effect of historical accumulations in the harbour.

7. RECOMMENDATIONS

(1) The primary issue for Port Hope Harbour concerns the isolation or disposal of historically contaminated sediment in the Turning Basin. Once this is resolved, the future use(s) of the Harbour will determine whether the non-industrial sources of localized water quality degradation will require closer attention.

(2) Given the summer shutdown of CAMECO, the lack of seasonal variability for parameters other than uranium, and the qualitative improvement in water quality over the past 10 years, future water quality monitoring in the harbour can be confined to the spring and fall and need not be repeated at the scale undertaken in this study until after the sediment problem is resolved. Direct monitoring of drinking water supplies (in conjunction with the MOEE Drinking Water Surveillance Program) will best ensure the absence of adverse effects outside the harbour in the interim.

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International Joint Commission 1989. *Revised Great Lakes Water Quality Agreement of 1978*, (as amended by protocol signed November 18, 1987), consolidated by the International Joint Commission United States and Canada.

Ontario Ministry of the Environment 1983. *Handbook of Analytical Methods for Environmental Samples*, Laboratory Services Branch.

APPENDIX I: 1992 SUMMARY STATISTICS

SUMMARY STATISTICS

***** NOTE:

STNT- station type
STN#- station number
N - number of data points
#>DL- number of values > MDL
SDEV- unbiased estimate of the standard deviation
999 - wild card identifier ie. ALL INCLUSIVE
TYP - type of statistics used eg.
*HD - traditional approach where <W values are replaced by half the MDL
*FD - traditional approach where <W values are replaced with the MDL
MLE - Maximum Likelihood Estimator used if:
at least 3 values are > MDL
at least 20% of the data is > MDL
MVU - Maximum Variance Unbiased Estimate used ie. mean estimate > max. value
*GM - geometric mean used ie. both orig. mean est. and MVU mean > max. value

Mean and 95% Confidence Interval values are Back-Transformed (SDEV is NOT) if LOG Transformation is selected.

***** PARAMETER NAME: CHLORIDE

***** UNITS: MG/L

STNT	STN#	N	#>DL	%>DL	MINIMUM	MAXIMUM	MEAN	TYP	SDEV	95% CI-LL	95% CI-UL
ALL STATIONS		81	81	100.0	12.10000	25.90000	20.56913		3.29866	19.83854	21.29972
1	2009	11	11	100.0	20.50000	22.80000	21.80000		.70563	21.32598	22.27402
1	2010	10	10	100.0	20.40000	23.40000	21.90000		.77311	21.34699	22.45301
1	2011	10	10	100.0	20.60000	22.90000	21.96000		.83430	21.36321	22.55678
1	2012	9	9	100.0	12.10000	20.30000	17.22222		2.84420	15.03598	19.40846
1	2013	11	11	100.0	14.50000	25.30000	20.60909		4.03743	17.89688	23.32130
1	2014	11	11	100.0	14.70000	25.50000	20.42727		4.30840	17.53303	23.32152
1	2015	9	9	100.0	14.40000	25.90000	19.31111		4.23805	16.05346	22.56876
1	2016	10	10	100.0	15.20000	25.90000	20.75000		3.76366	18.05783	23.44217

***** PARAMETER NAME: FIELD CONDUCTIVITY

***** UNITS: UMHO/CM

STNT	STN#	N	#>DL	%>DL	MINIMUM	MAXIMUM	MEAN	TYP	SDEV	95% CI-LL	95% CI-UL
ALL STATIONS		8	8	100.0	125	544	414				
1	2009	1	1	100.0	332	332	332				
1	2010	1	1	100.0	332	332	332				
1	2011	1	1	100.0	353	353	353				
1	2012	1	1	100.0	125	125	125				
1	2013	1	1	100.0	540	540	540				
1	2014	1	1	100.0	543	543	543				
1	2015	1	1	100.0	544	544	544				
1	2016	1	1	100.0	540	540	540				

***** PARAMETER NAME: LABORATORY CONDUCTIVITY AT 25 oC

***** UNITS: UMHO/CM

STNT	STN#	N	#>DL	%>DL	MINIMUM	MAXIMUM	MEAN	TYP	SDEV	95% CI-LL	95% CI-UL
ALL STATIONS		81	81	100.0	314	513	395		73	379	411
1	2009	11	11	100.0	314	336	322		7	317	327
1	2010	10	10	100.0	316	336	322		7	317	327
1	2011	10	10	100.0	320	360	331		12	323	340
1	2012	9	9	100.0	355	507	430		56	387	473
1	2013	11	11	100.0	353	510	447		61	406	488
1	2014	11	11	100.0	352	513	434		64	391	477
1	2015	9	9	100.0	355	512	430		70	377	484
1	2016	10	10	100.0	354	511	447		66	400	494

***** PARAMETER NAME: DISSOLVED OXYGEN

***** UNITS: MG/L

STNT	STN#	N	#>DL	%>DL	MINIMUM	MAXIMUM	MEAN	TYP	SDEV	95% CI-LL	95% CI-UL
ALL STATIONS		66	66	100.0	7.98000	13.19000	11.07106		1.53303	10.69397	11.44815
1	2009	9	9	100.0	10.10000	12.90000	11.95667		.81965	11.32663	12.58670
1	2010	8	8	100.0	10.77000	12.85000	11.90000		.64613	11.35974	12.44026
1	2011	8	8	100.0	11.50000	13.15000	12.31375		.58089	11.82804	12.79946
1	2012	7	7	100.0	9.20000	13.19000	11.81286		1.67934	10.25967	13.36604
1	2013	9	9	100.0	8.15000	12.50000	10.34778		1.54314	9.16161	11.53394
1	2014	10	10	100.0	8.10000	12.75000	10.44200		1.69138	9.23214	11.65186
1	2015	7	7	100.0	7.98000	11.80000	9.60286		1.39519	8.31248	10.89324
1	2016	8	8	100.0	8.86000	11.80000	10.23875		1.23324	9.20757	11.26993

***** PARAMETER NAME: FFIDUR (FLUORIDE)

***** UNITS: MG/L

STNT	STN#	N	#>DL	%>DL	MINIMUM	MAXIMUM	MEAN	TYP	SDEV	95% CI-LL	95% CI-UL
ALL STATIONS		81	81	100.0	.06000	.16000	.12370		.02305	.11860	.12881
1	2009	11	11	100.0	.12000	.14000	.13091		.01044	.12389	.13793
1	2010	10	10	100.0	.12000	.14000	.13000		.01054	.12246	.13754
1	2011	10	10	100.0	.12000	.16000	.12600		.01350	.11634	.13566
1	2012	9	9	100.0	.06000	.12000	.09556		.01944	.08062	.11050
1	2013	11	11	100.0	.10000	.16000	.13273		.02412	.11652	.14893
1	2014	11	11	100.0	.08000	.16000	.12727		.02724	.10898	.14557
1	2015	9	9	100.0	.10000	.16000	.12444		.02404	.10597	.14292
1	2016	10	10	100.0	.08000	.16000	.11800		.03048	.09620	.13980

***** PARAMETER NAME: SECCHI DEPTH

***** UNITS: METRES

STNT	STN#	N	#>DL	%>DL	MINIMUM	MAXIMUM	MEAN	TYP	SDEV	95% CI-LL	95% CI-UL
ALL STATIONS		77	77	100.0	.20000	4.60000	1.02208		1.03956	.78577	1.25838
1	2009	11	11	100.0	.60000	4.20000	2.11818		1.32651	1.22707	3.00929
1	2010	10	10	100.0	.80000	4.60000	2.09000		1.40036	1.08831	3.09169
1	2011	9	9	100.0	.60000	2.70000	1.21111		.81155	.58730	1.83492
1	2012	8	8	100.0	.40000	1.60000	.93750		.37773	.62166	1.25334
1	2013	11	11	100.0	.30000	.70000	.43636		.15667	.33112	.54161
1	2014	11	11	100.0	.20000	.80000	.40909		.17581	.29099	.52719
1	2015	8	8	100.0	.20000	.80000	.40000		.20702	.22690	.57310
1	2016	9	9	100.0	.20000	.80000	.40000		.18708	.25620	.54380

***** PARAMETER NAME: WATER TEMPERATURE

***** UNITS: DEG.C

STNT	STN#	N	#>DL	%>DL	MINIMUM	MAXIMUM	MEAN	TYP	SDEV	95% CI-LL	95% CI-UL
ALL STATIONS		81	81	100.0	2.00000	13.90000	7.33704		3.12684	6.64450	8.02957
1	2009	11	11	100.0	4.40000	9.60000	6.53636		1.99764	5.19442	7.87831
1	2010	10	10	100.0	4.40000	9.80000	6.46000		2.00843	5.02336	7.89664
1	2011	10	10	100.0	4.10000	9.00000	6.01000		2.04963	4.54388	7.47612
1	2012	9	9	100.0	2.00000	12.50000	6.35556		4.68138	2.75714	9.95397
1	2013	11	11	100.0	5.20000	13.90000	7.89091		3.30377	5.67154	10.11028
1	2014	11	11	100.0	5.60000	13.80000	8.61818		3.34509	6.37106	10.86530
1	2015	9	9	100.0	5.70000	13.10000	9.01111		3.44617	6.36215	11.66007
1	2016	10	10	100.0	5.10000	12.60000	7.78000		3.11155	5.55428	10.00572

***** PARAMETER NAME: PH

***** UNITS:

STNT	STN#	N	#>DL	%>DL	MINIMUM	MAXIMUM	MEAN	TYP	SDEV	95% CI-LL	95% CI-UL
ALL STATIONS		81	81	100.0	8.11000	8.40000	8.23210		.07268	8.21600	8.24819
1	2009	11	11	100.0	8.22000	8.37000	8.27364		.04737	8.24182	8.30546
1	2010	10	10	100.0	8.19000	8.36000	8.26600		.05112	8.22944	8.30256
1	2011	10	10	100.0	8.21000	8.34000	8.27000		.03674	8.24372	8.29628
1	2012	9	9	100.0	8.20000	8.40000	8.32000		.06008	8.27382	8.36619
1	2013	11	11	100.0	8.11000	8.26000	8.18273		.04931	8.14960	8.21585
1	2014	11	11	100.0	8.12000	8.23000	8.17273		.04092	8.14524	8.20022
1	2015	9	9	100.0	8.11000	8.23000	8.18111		.04300	8.14806	8.21416
1	2016	10	10	100.0	8.11000	8.38000	8.20100		.08407	8.14086	8.26114

***** PARAMETER NAME: SUSPENDED SOLIDS

***** UNITS: MG/L

STNT	STN#	N	#>DL	%>DL	MINIMUM	MAXIMUM	MEAN	TYP	SDEV	95% CI-LL	95% CI-UL
ALL STATIONS		81	81	100.0	1.40000	68.20000	20.13580		15.53882	16.69424	23.57736
1	2009	11	11	100.0	1.50000	11.30000	4.68182		3.05772	2.62774	6.73589
1	2010	10	10	100.0	1.40000	12.50000	5.52000		4.16595	2.54007	8.49993
1	2011	10	10	100.0	2.50000	16.30000	7.92000		5.18755	4.20931	11.63069
1	2012	9	9	100.0	7.90000	68.20000	19.32222		19.11123	4.63205	34.01239
1	2013	11	11	100.0	16.90000	48.00000	32.11818		9.26143	25.89666	38.33970
1	2014	11	11	100.0	15.70000	58.20000	32.98182		14.38310	23.31972	42.64392
1	2015	9	9	100.0	16.80000	49.10000	28.80000		10.27437	20.90243	36.69756
1	2016	10	10	100.0	14.90000	44.10000	29.59000		10.03388	22.41269	36.76731

***** PARAMETER NAME: TURBIDITY

***** UNITS: FTU

STNT	STN#	N	#>DL	%>DL	MINIMUM	MAXIMUM	MEAN	TYP	SDEV	95% CI-LL	95% CI-UL
ALL STATIONS		81	81	100.0	.82000	54.00000	19.49148		15.05564	16.15693	22.82603
1	2009	11	11	100.0	.96000	15.40000	4.19818		4.25971	1.33665	7.05972
1	2010	10	10	100.0	.82000	8.80000	4.73400		3.15851	2.47469	6.99331
1	2011	10	10	100.0	1.73000	14.40000	7.60000		4.48667	4.39065	10.80935
1	2012	9	9	100.0	5.48000	27.00000	13.29889		7.07606	7.85976	18.73802
1	2013	11	11	100.0	16.10000	50.00000	34.74545		10.77928	27.50429	41.98662
1	2014	11	11	100.0	15.00000	54.00000	32.74546		13.75299	23.50665	41.98426
1	2015	9	9	100.0	16.60000	45.40000	27.87778		8.78917	21.12184	34.63372
1	2016	10	10	100.0	15.70000	43.00000	29.63000		10.25747	22.29276	36.96724

***** PARAMETER NAME: AMMONIA

***** UNITS: MG/L

STNT	STN#	N	#>DL	%>DL	MINIMUM	MAXIMUM	MEAN	TYP	SDEV	95% CI-LL	95% CI-UL
ALL STNS.		81	79	97.5	.00200	.17000	.05748	MLE	.06144	.04387	.07108
1	2009	11	11	100.0	.00800	.02200	.01327		.00467	.01013	.01641
1	2010	10	10	100.0	.01000	.02000	.01500		.00368	.01237	.01763
1	2011	10	10	100.0	.00800	.02600	.01680		.00605	.01247	.02113
1	2012	9	9	100.0	.00400	.05600	.02422		.02050	.00846	.03998
1	2013	11	11	100.0	.00400	.16200	.09018		.06239	.04827	.13209
1	2014	11	10	90.9	.00200	.17000	.08523	MLE	.07388	.03559	.13486
1	2015	9	8	88.9	.00200	.17000	.10903	MLE	.07038	.05493	.16312
1	2016	10	10	100.0	.00400	.16800	.10580		.05866	.06384	.14776

***** PARAMETER NAME: NITRATE

***** UNITS: MG/L

STNT	STN#	N	#>DL	%>DL	MINIMUM	MAXIMUM	MEAN	TYP	SDEV	95% CI-LL	95% CI-UL
ALL STNS.		81	81	100.0	.30000	1.59000	.83790		.52066	.72259	.95322
1	2009	11	11	100.0	.31000	.56500	.37136		.08050	.31729	.42544
1	2010	10	10	100.0	.30000	.52500	.36950		.07236	.31774	.42126
1	2011	10	10	100.0	.32000	.70000	.42950		.11162	.34966	.50934
1	2012	9	9	100.0	.41500	1.59000	1.09333		.49167	.71540	1.47127
1	2013	11	11	100.0	.45500	1.52000	1.18318		.46777	.86895	1.49742
1	2014	11	11	100.0	.44500	1.52000	1.10909		.51579	.76260	1.45558
1	2015	9	9	100.0	.44000	1.52000	1.01333		.53150	.60479	1.42188
1	2016	10	10	100.0	.46000	1.52000	1.16200		.48639	.81408	1.50992

***** PARAMETER NAME: NITRITE

***** UNITS: MG/L

STNT	STN#	N	#>DL	%>DL	MINIMUM	MAXIMUM	MEAN	TYP	SDEV	95% CI-LL	95% CI-UL
ALL STNS.		81	81	100.0	.00100	.04900	.01158		.00936	.00951	.01365
1	2009	11	11	100.0	.00300	.00600	.00427		.00135	.00337	.00518
1	2010	10	10	100.0	.00300	.01200	.00490		.00288	.00284	.00696
1	2011	10	10	100.0	.00300	.00800	.00520		.00140	.00420	.00620
1	2012	9	9	100.0	.00800	.04400	.01433		.01122	.00571	.02296
1	2013	11	11	100.0	.01000	.02100	.01409		.00404	.01138	.01680
1	2014	11	11	100.0	.00900	.04900	.02027		.01484	.01030	.03024
1	2015	9	9	100.0	.00800	.02000	.01444		.00430	.01114	.01775
1	2016	10	10	100.0	.00100	.03400	.01530		.00913	.00877	.02183

***** PARAMETER NAME: TOTAL KJELDAHL NITROGEN

***** UNITS: MG/L

STNT	STN#	N	#>DL	%>DL	MINIMUM	MAXIMUM	MEAN	TYP	SDEV	95% CI-LL	95% CI-UL
ALL STNS.		81	81	100.0	.23000	.80000	.48907		.19971	.44484	.53331
1	2009	11	11	100.0	.24000	.31000	.26273		.02240	.24768	.27778
1	2010	10	10	100.0	.23000	.31000	.26900		.02514	.25101	.28699
1	2011	10	10	100.0	.26000	.31000	.28100		.01449	.27063	.29137
1	2012	9	9	100.0	.32000	.58000	.42000		.09407	.34769	.49231
1	2013	11	11	100.0	.49000	.78000	.66591		.08806	.60675	.72506
1	2014	11	11	100.0	.51000	.80000	.64364		.08310	.58781	.69946
1	2015	9	9	100.0	.57000	.77500	.67611		.07227	.62056	.73167
1	2016	10	10	100.0	.54000	.77000	.69550		.07251	.64363	.74737

***** PARAMETER NAME: PHOSPHATE

***** UNITS: MG/L

STNT STN#	N	#>DL	%>DL	MINIMUM	MAXIMUM	MEAN	TYP	SDEV	95% CI-LL	95% CI-UL
ALL STNS.	81	63	77.8	.00100	.01300	.00320	MLE	.00407	.00229	.00410
1 2009	11	3	27.3	.00100	.00150	.00067	MLE	.00055	.00030	.00104
1 2010	10	4	40.0	.00100	.00200	.00079	MLE	.00066	.00032	.00126
1 2011	10	7	70.0	.00100	.00200	.00114	MLE	.00055	.00074	.00153
1 2012	9	8	88.9	.00100	.00250	.00153	MLE	.00051	.00113	.00192
1 2013	11	11	100.0	.00250	.01000	.00577		.00297	.00378	.00777
1 2014	11	11	100.0	.00100	.01000	.00518		.00306	.00313	.00724
1 2015	9	9	100.0	.00250	.01300	.00744		.00348	.00477	.01012
1 2016	10	10	100.0	.00200	.01050	.00670		.00319	.00442	.00898

***** PARAMETER NAME: TOTAL PHOSPHORUS

***** UNITS: MG/L

STNT STN#	N	#>DL	%>DL	MINIMUM	MAXIMUM	MEAN	TYP	SDEV	95% CI-LL	95% CI-UL
ALL STNS.	81	81	100.0	.00500	.11900	.05044		.03387	.04294	.05795
1 2009	11	11	100.0	.00600	.02400	.01355		.00607	.00947	.01762
1 2010	10	10	100.0	.00500	.01800	.01250		.00430	.00942	.01558
1 2011	10	10	100.0	.01000	.02600	.01730		.00583	.01313	.02147
1 2012	9	9	100.0	.02300	.07600	.04200		.01796	.02820	.05580
1 2013	11	11	100.0	.05100	.10700	.08145		.01740	.06976	.09315
1 2014	11	11	100.0	.05000	.11900	.08109		.02244	.06601	.09617
1 2015	9	9	100.0	.06100	.10800	.07756		.01667	.06474	.09037
1 2016	10	10	100.0	.05200	.10000	.07750		.01574	.06624	.08876

***** PARAMETER NAME: SULPHATE

***** UNITS: MG/L

STNT	STN#	N	#>DL	%>DL	MINIMUM	MAXIMUM	MEAN	TYP	SDEV	95% CI-LL	95% CI-UL
ALL STNS.		81	81	100.0	18.26000	26.95000	23.99099		2.04932	23.53710	24.44488
1	2009	11	11	100.0	24.94000	26.67000	26.21727		.49068	25.88765	26.54690
1	2010	10	10	100.0	25.07000	26.89000	26.35900		.60145	25.92878	26.78922
1	2011	10	10	100.0	25.04000	26.95000	26.32200		.57357	25.91172	26.73228
1	2012	9	9	100.0	20.19000	23.22000	21.84444		.88722	21.16246	22.52642
1	2013	11	11	100.0	20.98000	24.18000	22.74545		.91147	22.13316	23.35775
1	2014	11	11	100.0	19.63000	23.36000	22.61364		1.12258	21.85953	23.36775
1	2015	9	9	100.0	21.57000	23.87000	22.89667		.70111	22.35775	23.43558
1	2016	10	10	100.0	18.26000	23.92000	22.64500		1.59837	21.50167	23.78833

***** PARAMETER NAME: ARSENIC

***** UNITS: MG/L

STNT	STN#	N	#>DL	%>DL	MINIMUM	MAXIMUM	MEAN	TYP	SDEV	95% CI-LL	95% CI-UL
ALL STATIONS		81	42	51.9	.00100	.00700	.00132	MLE	.00264	.00073	.00190
1	2009	11	0	.0	.00100	.00000	.00050	*HD	.00000	.00000	.00000
1	2010	10	0	.0	.00100	.00000	.00050	*HD	.00000	.00000	.00000
1	2011	10	0	.0	.00100	.00000	.00050	*HD	.00000	.00000	.00000
1	2012	9	2	22.2	.00100	.00300	.00094	*HD	.00092	.00024	.00165
1	2013	11	10	90.9	.00100	.00700	.00329	MLE	.00183	.00205	.00452
1	2014	11	11	100.0	.00200	.00700	.00364		.00150	.00263	.00465
1	2015	9	9	100.0	.00200	.00600	.00356		.00124	.00261	.00451
1	2016	10	10	100.0	.00200	.00400	.00320		.00092	.00254	.00386

***** PARAMETER NAME: COPPER

***** UNITS: MG/L

STNT	STN#	N	#>DL	%>DL	MINIMUM	MAXIMUM	MEAN	TYP	SDEV	95% CI-LL	95% CI-UL
ALL STATIONS		81	65	80.2	.00050	.00800	.00136	MLE	.00135	.00106	.00166
1	2009	11	7	63.6	.00050	.00100	.00073	*HD	.00038	.00047	.00098
1	2010	10	7	70.0	.00050	.00200	.00084	MLE	.00059	.00042	.00127
1	2011	10	9	90.0	.00050	.00200	.00103	MLE	.00040	.00074	.00132
1	2012	9	5	55.6	.00050	.00100	.00067	*HD	.00040	.00036	.00097
1	2013	11	10	90.9	.00050	.00400	.00218	MLE	.00118	.00139	.00297
1	2014	11	10	90.9	.00050	.00300	.00182	MLE	.00098	.00117	.00248
1	2015	9	8	88.9	.00050	.00800	.00235	MLE	.00251	.00042	.00428
1	2016	10	9	90.0	.00050	.00300	.00192	MLE	.00084	.00131	.00252

***** PARAMETER NAME: IRON

***** UNITS: MG/L

STNT	STN#	N	#>DL	%>DL	MINIMUM	MAXIMUM	MEAN	TYP	SDEV	95% CI-LL	95% CI-UL
ALL STATIONS		81	72	88.9	.02000	.57000	.21985	MLE	.17792	.18045	.25926
1	2009	11	7	63.6	.02000	.21000	.03506	MLE	.07837	-.01759	.08770
1	2010	10	7	70.0	.02000	.09700	.04306	MLE	.03863	.01542	.07069
1	2011	10	8	80.0	.02000	.16000	.07762	MLE	.05482	.03841	.11683
1	2012	9	9	100.0	.10000	.33000	.18556		.07055	.13132	.23979
1	2013	11	11	100.0	.27000	.54000	.38545		.08153	.33068	.44022
1	2014	11	11	100.0	.23000	.57000	.36455		.10453	.29432	.43477
1	2015	9	9	100.0	.20000	.43000	.34889		.08223	.28568	.41209
1	2016	10	10	100.0	.20000	.54000	.36100		.10493	.28594	.43606

***** PARAMETER NAME: TOTAL URANIUM

***** UNITS: UG/L

STNT	STN#	N	#>DL	%>DL	MINIMUM	MAXIMUM	MEAN	TYP	SDEV	95% CI-LL	95% CI-UL
ALL STATIONS		81	81	100.0	.30000	45.00000	13.76802		15.29107	10.38134	17.15471
1	2009	11	11	100.0	.30000	.61000	.47636		.10595	.40519	.54754
1	2010	10	10	100.0	.30000	1.00000	.49300		.20726	.34475	.64125
1	2011	10	10	100.0	.30000	1.10000	.58600		.19973	.44313	.72887
1	2012	9	9	100.0	.78000	13.00000	4.36444		3.75005	1.48191	7.24698
1	2013	11	11	100.0	8.50000	39.00000	27.22727		11.90245	19.23160	35.22295
1	2014	11	11	100.0	8.00000	45.00000	27.17273		14.08219	17.71277	36.63268
1	2015	9	9	100.0	7.40000	38.00000	22.50000		13.39272	12.20546	32.79454
1	2016	10	10	100.0	7.00000	38.00000	25.90000		12.43159	17.00759	34.79241

---------- CORRELATION MATRIX ----------

TURNING BASIN STATIONS (2013-2016)

	CHLORIDE	COND25	SUSPSED	PHOSPH	IRON	TOTAL-U	DISS-U	RA-226
CHLORIDE	1.00000							
COND25	.57152	1.00000						
SUSPSED	.17336	.18374	1.00000					
PHOSPH	.18930	.06415	.94523	1.00000				
IRON	.29053	.19232	.88676	.81587	1.00000			
TOTAL-U	.91049	.79444	.35213	.29283	.41931	1.00000		
DISS-U	.88046	.80261	.37701	.30155	.43897	.97806	1.00000	
RA-226	-.28114	.35726	.18796	.10283	.08860	.00709	.04126	1.00000

CRITICAL VALUE (1-tail, .05) = + or - .27114
CRITICAL VALUE (2-tail, .05) = +/- .31975

N = 38

---------- CORRELATION MATRIX ----------

OPEN LAKE STATIONS (2009-2012)

	CHLORIDE	COND25	SUSPSED	PHOSPH	IRON	TOTAL-U
CHLORIDE	1.00000					
COND25	.35875	1.00000				
SUSPSED	.51409	.50251	1.00000			
PHOSPH	.24168	.62266	.73614	1.00000		
IRON	.50389	.69923	.80184	.71563	1.00000	
TOTAL-U	-.11894	.70185	.41046	.53592	.53030	1.00000

CRITICAL VALUE (1-tail, .05) = + or - .30127
CRITICAL VALUE (2-tail, .05) = +/- .35441

N = 31

---------- ANALYSIS OF VARIANCE ----------

TWO-WAY ANOVA FOR IRON

SOURCE	SUM OF SQUARES	D.F.	MEAN SQUARE	F RATIO	PROB.
STATIONS	1.513	7	.216	41.409	-1.000E-13
SEASONS	.066	2	.033	6.350	3.576E-03
INTERACTION	.042	14	2.9851E-03	.572	.8734
ERROR	.251	48	5.2195E-03		
TOTAL	1.872	71			

---------- ANALYSIS OF VARIANCE ----------

TWO-WAY ANOVA FOR TOTAL PHOSPHORUS

SOURCE	SUM OF SQUARES	D.F.	MEAN SQUARE	F RATIO	PROB.
STATIONS	69470.833	7	9924.405	51.873	1.000E-14
SEASONS	652.444	2	326.222	1.705	.1926
INTERACTION	1625.333	14	116.095	.607	.8460
ERROR	9183.333	48	191.319		
TOTAL	80931.944	71			

---------- ANALYSIS OF VARIANCE ----------

TWO-WAY ANOVA FOR TOTAL URANIUM

SOURCE	SUM OF SQUARES	D.F.	MEAN SQUARE	F RATIO	PROB.
STATIONS	11127.159	7	1589.594	302.864	-1.000E-13
SEASONS	2901.584	2	1450.792	276.418	.000E+00
INTERACTION	2575.878	14	183.991	35.056	.000E+00
ERROR	251.930	48	5.249		
TOTAL	16856.552	71			

APPENDIX II: 1992 DATA LISTING

STN #	DATE YYMMDD	TIME	SAMPLE DEPTH (m.)	SAMPLE TYPE	FIELD SAMPLE NUMBER	CHLORIDE MG/L as Cl-	CONDUCT. 25 DEG.C UMHO/CM at 25C	DISS. OXYGEN MG/L as O	FLUORIDE MG/L as F	SECCHI DEPTH M	WATER TEMP. DEG.C	PH	SUSPEND. SEDIMENT MG/L	TURBIDITY FTU
2009	920413	1148	0.5	11	00042893	22.80	336	12.80	0.14	0.6	4.60	8.28	11.3	15.40
2009	920414	921	0.5	11	00042903	22.40	329	12.40	0.14	1.1	4.40	8.30	4.1	4.70
2009	920415	1445	0.5	11	00042913	22.70	331	12.90	0.14	1.0	5.20	8.22	5.8	6.80
2009	920622	1235	0.5	11	00040802	21.60	318	11.78	0.14	3.5	7.90	8.28	2.1	0.96
2009	920623	910	0.5	11	00040817	20.50	323	10.10	0.14	2.9	9.60	8.31	3.2	1.41
2009	920624	920	0.5	11	00040822	21.80	317	11.73	0.12	4.2	9.20	8.31	1.5	1.50
2009	920625	932	0.5	11	00040838	20.80	320	12.10	0.12	4.0	9.10	8.37	1.8	1.29
2009	921117	820	0.5	11	00044828	22.00	320	NO DATA	0.12	1.0	5.30	8.23	7.7	4.50
2009	921117	910	0.5	11	00044837	21.80	319	NO DATA	0.14	1.0	5.40	8.22	7.4	6.02
2009	921118	825	0.5	11	00044841	21.80	316	11.80	0.12	1.8	5.20	8.23	3.8	1.94
2009	921119	835	0.5	11	00044851	21.60	314	12.00	0.12	2.2	6.00	8.26	2.8	1.66
2010	920414	916	0.5	11	00042902	22.60	331	12.45	0.12	1.2	4.40	8.28	5.4	6.90
2010	920415	1441	0.5	11	00042912	23.40	336	12.85	0.14	0.9	5.60	8.24	8.1	8.80
2010	920622	1243	0.5	11	00040803	20.40	326	10.77	0.14	2.5	9.80	8.30	4.3	3.90
2010	920623	905	0.5	11	00040816	21.60	318	11.70	0.14	3.1	6.30	8.29	2.3	0.93
2010	920624	926	0.5	11	00040823	21.80	317	11.62	0.12	4.0	9.20	8.30	1.4	2.20
2010	920625	940	0.5	11	00040839	21.80	316	11.51	0.14	4.6	8.80	8.36	1.6	0.82
2010	921117	825	0.5	11	00044829	22.20	321	NO DATA	0.12	0.9	5.10	8.19	12.3	8.42
2010	921117	915	0.5	11	00443838	22.00	321	NO DATA	0.14	0.8	5.20	8.21	12.5	8.26
2010	921118	830	0.5	11	00044842	21.60	320	12.00	0.12	1.0	5.00	8.22	5.0	4.75
2010	921119	840	0.5	11	00044852	21.60	316	12.30	0.12	1.9	5.20	8.27	2.3	2.36
2011	920413	1143	0.5	11	00042892	22.90	331	13.15	0.14	0.6	4.60	8.25	9.2	10.70
2011	920414	909	0.5	11	00042901	22.60	331	12.40	0.12	1.0	4.50	8.31	5.5	5.90
2011	920415	1438	0.5	11	00042911	21.70	360	12.80	0.12	0.8	5.50	8.26	13.1	10.80
2011	920622	1227	0.5	11	00040801	22.00	320	11.69	0.16	NO DATA	8.80	8.26	2.7	1.73
2011	920624	915	0.5	11	00040821	20.60	323	11.50	0.12	2.7	9.00	8.28	3.0	5.30
2011	920625	927	0.5	11	00040837	20.70	324	11.97	0.12	2.5	9.00	8.34	2.5	2.10
2011	921117	830	0.5	11	00044830	22.40	325	NO DATA	0.12	0.8	5.00	8.24	16.3	10.70
2011	921117	920	0.5	11	00044839	22.60	326	NO DATA	0.12	0.6	4.90	8.21	14.4	14.40
2011	921118	835	0.5	11	00044843	22.70	343	12.20	0.12	0.7	4.10	8.26	8.4	11.20
2011	921119	845	0.5	11	00044853	21.40	330	12.80	0.12	1.2	4.70	8.29	4.1	3.17
2012	920413	1102	0.5	11	00042885	19.30	435	13.19	0.10	0.4	2.90	8.20	25.4	27.00
2012	920414	839	0.5	11	00042895	20.30	451	12.30	0.08	0.6	2.90	8.40	16.1	14.60
2012	920415	1417	0.5	11	00042905	20.10	445	12.90	0.10	0.7	5.70	8.34	15.4	17.50
2012	920416	1000	0.5	11	00042915	19.50	445	12.50	0.10	NO DATA	4.50	8.25	68.2	20.00
2012	920622	1251	0.5	11	00040804	12.10	375	9.60	0.12	1.2	12.40	8.36	7.9	9.60
2012	920623	857	0.5	11	00040815	14.40	361	9.20	0.12	1.0	12.30	8.32	9.4	8.60
2012	920624	932	0.5	11	00040824	15.50	355	NO DATA	0.10	1.1	12.50	8.32	8.3	10.00
2012	921116	1415	0.5	11	00044821	16.70	497	NO DATA	0.08	1.6	2.00	8.35	12.1	6.91
2012	921118	840	0.5	11	00044844	17.10	507	13.00	0.06	0.9	2.00	8.34	11.1	5.48
2013	920413	1115	0.5	11	00042886	25.30	451	12.50	0.16	0.3	5.80	8.11	35.0	45.00
2013	920414	846	0.5	11	00042896	25.10	452	10.70	0.16	0.3	5.80	8.16	25.8	32.00
2013	920415	1421	0.5	11	00042906	25.20	452	12.20	0.16	0.4	7.60	8.24	29.5	27.00

STN #	DATE YYMMDD	TIME	SAMPLE DEPTH (m.)	SAMPLE TYPE	FIELD SAMPLE NUMBER	CHLORIDE MG/L as Cl-	CONDUCT. 25 DEG.C UMHO/CM at 25C	DISS. OXYGEN MG/L as O	FLUORIDE MG/L as F	SECCHI DEPTH M	WATER TEMP. DEG.C	PH	SUSPEND. SEDIMENT MG/L	TURBIDITY FTU
2013	920416	1007	0.5	11	00042916	24.70	455	11.50	0.16	0.4	7.10	8.15	44.1	50.00
2013	920622	1300	0.5	11	00040805	14.50	364	8.15	0.12	0.7	13.90	8.24	39.4	37.00
2013	920623	851	0.5	11	00040814	15.10	362	8.60	0.14	0.7	12.70	8.26	23.7	22.00
2013	920625	900	0.5	11	00040832	17.10	353	9.08	0.10	0.6	12.00	8.20	29.5	41.00
2013	921116	1420	0.5	11	00044822	19.30	504	NO DATA	0.12	0.3	5.30	8.19	35.2	36.50
2013	921117	840	0.5	11	00044833	19.50	507	NO DATA	0.10	0.3	5.60	8.13	48.0	47.30
2013	921118	845	0.5	11	00044845	20.30	509	10.20	0.12	0.4	5.20	8.14	26.2	28.30
2013	921119	855	0.5	11	00044856	20.60	510	10.20	0.12	0.4	5.80	8.19	16.9	16.10
2014	920413	1120	0.5	11	00042887	25.50	451	12.40	0.16	0.2	5.90	8.15	36.7	42.00
2014	920413	1125	0.5	11	00042888	25.50	452	12.75	0.16	0.3	5.70	8.14	36.5	33.00
2014	920415	1425	0.5	11	00042907	25.10	454	12.05	0.16	0.4	7.70	8.21	25.9	20.00
2014	920416	1009	0.5	11	00042917	24.80	456	11.65	0.14	0.4	7.10	8.13	58.2	54.00
2014	920622	1304	0.5	11	00040806	14.70	364	8.10	0.12	0.5	13.80	8.22	39.8	43.00
2014	920623	847	0.5	11	00040813	15.20	364	8.70	0.14	0.6	12.90	8.21	21.8	18.60
2014	920624	855	0.5	11	00040831	17.40	353	9.02	0.10	0.4	12.00	8.19	26.8	37.00
2014	920624	945	0.5	11	00040827	15.60	352	9.05	0.08	0.8	12.20	8.23	15.7	20.00
2014	921117	845	0.5	11	00044834	19.70	503	NO DATA	0.12	0.2	5.80	8.13	56.7	51.40
2014	921118	850	0.5	11	00044846	20.50	509	10.50	0.10	0.3	5.60	8.17	27.8	26.20
2014	921119	900	0.5	11	00044857	20.70	513	10.20	0.12	0.4	6.10	8.12	16.9	15.00
2015	920414	857	0.5	11	00042899	25.90	455	11.05	0.14	0.3	5.90	8.14	26.6	33.00
2015	920415	1428	0.5	11	00042908	25.40	454	11.80	0.16	0.4	7.60	8.21	25.3	28.00
2015	920622	1310	0.5	11	00040807	14.40	365	7.98	0.12	0.4	13.10	8.22	40.0	34.00
2015	920623	840	0.5	11	00040812	15.00	364	8.70	0.16	NO DATA	13.00	8.22	30.0	19.50
2015	920624	950	0.5	11	00040828	15.50	357	8.81	0.10	0.8	12.20	8.23	16.8	22.00
2015	920625	910	0.5	11	00040834	17.40	355	8.88	0.10	0.6	12.00	8.18	25.0	24.00
2015	921116	1430	0.5	11	00044825	20.10	506	NO DATA	0.10	0.2	5.70	8.18	29.0	28.40
2015	921117	848	0.5	11	00044835	19.50	505	NO DATA	0.12	0.2	5.70	8.11	49.1	45.40
2015	921119	905	0.5	11	00044858	20.60	512	10.00	0.12	0.3	5.90	8.14	17.4	16.60
2016	920413	1129	0.5	11	00042889	25.60	453	11.80	0.16	0.3	5.70	8.12	36.6	43.00
2016	920414	902	0.5	11	00042900	25.90	451	11.05	0.16	0.4	5.90	8.38	26.2	31.00
2016	920416	1018	0.5	11	00042920	25.20	457	11.70	0.16	0.4	7.00	8.14	44.1	39.00
2016	920623	2016	0.5	11	00040811	15.20	364	8.90	0.10	NO DATA	12.60	8.24	24.7	18.80
2016	920624	955	0.5	11	00040829	17.20	357	8.86	0.08	0.8	12.10	8.26	14.9	15.70
2016	920625	905	0.5	11	00040833	17.20	354	9.00	0.10	0.6	12.00	8.22	26.9	29.00
2016	921116	1435	0.5	11	00044826	19.90	505	NO DATA	0.10	0.2	5.90	8.17	36.9	34.70
2016	921117	850	0.5	11	00044836	19.80	508	NO DATA	0.10	0.3	5.70	8.13	42.1	41.70
2016	921118	900	0.5	11	00044849	20.70	511	10.60	0.10	0.3	5.10	8.11	27.0	27.60
2016	921119	910	0.5	11	00044859	20.80	510	10.00	0.12	0.3	5.80	8.24	16.5	15.80

STN #	DATE YYMMDD	TIME	SAMPLE DEPTH (m.)	SMP TYPE	FIELD SAMPLE NUMBER	TOTAL AMMONIUM MG/L as N	TOTAL NITRATES MG/L as N	NITRITE MG/L as N	TOTAL KJELDAHL MG/L as N	PHOSPHATE MG/L as P	TOTAL PHOSPHOR. MG/L as P	SULPHATE MG/L as SO4
2009	920413	1148	0.5	11	00042893	0.010	0.565	0.0060	0.310	0.0010	0.024	26.18
2009	920414	921	0.5	11	00042903	0.008	0.425	0.0040	0.270	0.0010<	0.010	26.67
2009	920415	1445	0.5	11	00042913	0.010	0.460	0.0060	0.290	0.0010<	0.016	24.94
2009	920622	1235	0.5	11	00040802	0.010	0.320	0.0060	0.270	0.0010<	0.009	26.39
2009	920623	910	0.5	11	00040817	0.012	0.330	0.0050	0.270	0.0010<	0.024	25.79
2009	920624	920	0.5	11	00040822	0.020	0.310	0.0030	0.240	0.0010<	0.010	26.27
2009	920625	932	0.5	11	00040838	0.010	0.315	0.0030	0.250	0.0010<	0.006	26.45
2009	921117	820	0.5	11	00044828	0.014	0.355	0.0030	0.240	0.0015	0.016	26.61
2009	921117	910	0.5	11	00044837	0.022	0.360	0.0050	0.260	0.0015	0.015	26.59
2009	921118	825	0.5	11	00044841	0.018	0.330	0.0030	0.240	0.0010<	0.010	26.30
2009	921119	835	0.5	11	00044851	0.012	0.315	0.0030	0.250	0.0010<	0.009	26.20
2010	920414	916	0.5	11	00042902	0.010	0.470	0.0060	0.310	0.0010<	0.013	26.67
2010	920415	1441	0.5	11	00042912	0.014	0.525	0.0120	0.290	0.0010	0.014	25.07
2010	920622	1243	0.5	11	00040803	0.020	0.335	0.0070	0.300	0.0010<	0.018	25.53
2010	920623	905	0.5	11	00040816	0.010	0.315	0.0030	0.270	0.0010<	0.010	26.37
2010	920624	926	0.5	11	00040823	0.018	0.320	0.0050	0.230	0.0010<	0.007	26.89
2010	920625	940	0.5	11	00040839	0.012	0.300	0.0030	0.250	0.0010<	0.005	26.89
2010	921117	825	0.5	11	00044829	0.016	0.370	0.0040	0.250	0.0020	0.015	26.79
2010	921117	915	0.5	11	00443838	0.020	0.370	0.0030	0.270	0.0015	0.018	26.38
2010	921118	830	0.5	11	00044842	0.016	0.355	0.0030	0.250	0.0010	0.014	26.40
2010	921119	840	0.5	11	00044852	0.014	0.335	0.0030	0.270	0.0010<	0.011	26.60
2011	920413	1143	0.5	11	00042892	0.014	0.490	0.0060	0.280	0.0010	0.017	26.91
2011	920414	909	0.5	11	00042901	0.010	0.460	0.0060	0.310	0.0010<	0.014	26.59
2011	920415	1438	0.5	11	00042911	0.008	0.700	0.0080	0.290	0.0010	0.024	25.04
2011	920622	1227	0.5	11	00040801	0.020	0.320	0.0050	0.290	0.0010	0.013	26.65
2011	920624	915	0.5	11	00040821	0.026	0.340	0.0050	0.280	0.0010<	0.015	26.00
2011	920625	927	0.5	11	00040837	0.014	0.335	0.0040	0.280	0.0010<	0.010	26.11
2011	921117	830	0.5	11	00044830	0.020	0.385	0.0050	0.280	0.0020	0.022	26.95
2011	921117	920	0.5	11	00044839	0.020	0.385	0.0040	0.280	0.0020	0.022	26.73
2011	921118	835	0.5	11	00044843	0.024	0.465	0.0060	0.260	0.0015	0.026	26.15
2011	921119	845	0.5	11	00044853	0.012	0.415	0.0030	0.260	0.0010	0.010	26.09
2012	920413	1102	0.5	11	00042885	0.006	1.570	0.0440	0.580	0.0025	0.057	21.44
2012	920414	839	0.5	11	00042895	0.014	1.590	0.0110	0.450	0.0015	0.037	22.58
2012	920415	1417	0.5	11	00042905	0.008	1.370	0.0130	0.370	0.0020	0.044	23.22
2012	920416	1000	0.5	11	00042915	0.004	1.350	0.0090	0.570	0.0015	0.076	21.15
2012	920622	1251	0.5	11	00040804	0.040	0.495	0.0110	0.320	0.0010	0.024	20.19
2012	920623	857	0.5	11	00040815	0.054	0.450	0.0100	0.380	0.0015	0.056	21.73
2012	920624	932	0.5	11	00040824	0.056	0.415	0.0080	0.360	0.0010<	0.027	22.42
2012	921116	1415	0.5	11	00044821	0.014	1.290	0.0120	0.370	0.0015	0.023	22.18
2012	921118	840	0.5	11	00044844	0.022	1.310	0.0110	0.380	0.0015	0.034	21.69

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2013	920413	1115	0.5	11	00042886	0.010	1.390	0.0100	0.680	0.0030	0.091	22.71
2013	920414	846	0.5	11	00042896	0.042	1.410	0.0110	0.610	0.0025	0.075	22.74
2013	920415	1421	0.5	11	00042906	0.006	1.410	0.0120	0.720	0.0025	0.080	23.50
2013	920416	1007	0.5	11	00042916	0.004	1.410	0.0170	0.690	0.0025	0.107	20.98
2013	920622	1300	0.5	11	00040805	0.110	0.455	0.0130	0.570	0.0065	0.089	21.70
2013	920623	851	0.5	11	00040814	0.098	0.460	0.0120	0.490	0.0040	0.061	21.84
2013	920625	900	0.5	11	00040832	0.148	0.460	0.0110	0.610	0.0065	0.080	24.18
2013	921116	1420	0.5	11	00044822	0.134	1.490	0.0160	0.780	0.0100	0.093	23.00
2013	921117	840	0.5	11	00044833	0.136	1.510	0.0110	0.775	0.0080	0.103	23.14
2013	921118	845	0.5	11	00044845	0.142	1.520	0.0210	0.690	0.0095	0.066	23.15
2013	921119	855	0.5	11	00044856	0.162	1.500	0.0210	0.710	0.0085	0.051	23.26
2014	920413	1120	0.5	11	00042887	0.006	1.440	0.0490	0.610	0.0030	0.087	22.92
2014	920413	1125	0.5	11	00042888	0.004	1.440	0.0490	0.610	0.0030	0.088	22.92
2014	920415	1425	0.5	11	00042907	0.014	1.420	0.0210	0.620	0.0025	0.077	23.32
2014	920416	1009	0.5	11	00042917	0.002<	1.510	0.0090	0.710	0.0010	0.119	19.63
2014	920622	1304	0.5	11	00040806	0.122	0.465	0.0130	0.610	0.0090	0.097	21.60
2014	920623	847	0.5	11	00040813	0.094	0.470	0.0120	0.510	0.0035	0.061	22.31
2014	920624	855	0.5	11	00040831	0.160	0.460	0.0100	0.640	0.0075	0.081	22.96
2014	920624	945	0.5	11	00040827	0.122	0.445	0.0090	0.550	0.0030	0.056	23.29
2014	921117	845	0.5	11	00044834	0.144	1.520	0.0120	0.800	0.0100	0.112	23.33
2014	921118	850	0.5	11	00044846	0.136	1.520	0.0200	0.690	0.0070	0.064	23.11
2014	921119	900	0.5	11	00044857	0.170	1.510	0.0190	0.730	0.0075	0.050	23.36
2015	920414	857	0.5	11	00042899	0.002<	1.410	0.0190	0.690	0.0035	0.077	23.04
2015	920415	1428	0.5	11	00042908	0.008	1.380	0.0200	0.680	0.0025	0.066	22.82
2015	920622	1310	0.5	11	00040807	0.152	0.450	0.0140	0.740	0.0130	0.108	21.57
2015	920623	840	0.5	11	00040812	0.122	0.465	0.0120	0.570	0.0075	0.069	21.99
2015	920624	950	0.5	11	00040828	0.134	0.440	0.0080	0.570	0.0045	0.061	23.18
2015	920625	910	0.5	11	00040834	0.162	0.465	0.0100	0.630	0.0100	0.077	23.87
2015	921116	1430	0.5	11	00044825	0.130	1.490	0.0190	0.720	0.0105	0.070	23.31
2015	921117	848	0.5	11	00044835	0.132	1.520	0.0120	0.775	0.0070	0.103	23.12
2015	921119	905	0.5	11	00044858	0.170	1.500	0.0160	0.710	0.0085	0.067	23.17
2016	920413	1129	0.5	11	00042889	0.012	1.410	0.0340	0.660	0.0030	0.092	22.66
2016	920414	902	0.5	11	00042900	0.004	1.410	0.0260	0.710	0.0030	0.081	23.14
2016	920416	1018	0.5	11	00042920	0.062	1.400	0.0010	0.750	0.0020	0.100	18.26
2016	920623	2016	0.5	11	00040811	0.112	0.460	0.0130	0.760	0.0065	0.067	22.44
2016	920624	955	0.5	11	00040829	0.132	0.460	0.0100	0.540	0.0085	0.058	22.92
2016	920625	905	0.5	11	00040833	0.142	0.460	0.0100	0.610	0.0055	0.075	23.92
2016	921116	1435	0.5	11	00044826	0.146	1.490	0.0150	0.770	0.0105	0.086	23.05
2016	921117	850	0.5	11	00044836	0.136	1.520	0.0120	0.725	0.0090	0.093	23.14
2016	921118	900	0.5	11	00044849	0.144	1.510	0.0140	0.710	0.0105	0.071	23.32
2016	921119	910	0.5	11	00044859	0.168	1.500	0.0180	0.720	0.0085	0.052	23.60

STN #	DATE YYMMDD	TIME	SAMPLE DEPTH (m.)	SMP TYPE	FIELD SAMPLE NUMBER	ARSENIC MG/L as As	COPPER MG/L as Cu	IRON MG/L as Fe	NICKEL MG/L as Ni	TOTAL URANIUM UG/L as U	DISS. URANIUM UG/L	RADIUM 226 BQ/L
2009	920413	1148	0.5	11	00042893	0.001<	0.0010	0.210	0.002<	0.61	3.0<	0.008
2009	920414	921	0.5	11	00042903	0.001<	0.0010	0.066	0.002<	0.53	3.0<	0.014
2009	920415	1445	0.5	11	00042913	0.001<	0.0005<	0.059	0.002<	0.54	3.0<	0.007
2009	920622	1235	0.5	11	00040802	0.001<	0.0005<	0.020<	0.002<	0.30	3.0<	0.005<
2009	920623	910	0.5	11	00040817	0.001<	0.0005<	0.020<	0.002<	0.50	3.0<	0.005<
2009	920624	920	0.5	11	00040822	0.001<	0.0005<	0.020<	0.002<	0.30	3.0<	0.005<
2009	920625	932	0.5	11	00040838	0.001<	0.0010	0.020<	0.002<	0.50	3.0<	0.005<
2009	921117	820	0.5	11	00044828	0.001<	0.0010	0.075	0.002<	0.48	3.0<	0.009
2009	921117	910	0.5	11	00044837	0.001<	0.0010	0.065	0.002<	0.54	NO DATA	NO DATA
2009	921118	825	0.5	11	00044841	0.001<	0.0010	0.031	0.002<	0.37	3.0<	0.005<
2009	921119	835	0.5	11	00044851	0.001<	0.0010	0.021	0.002<	0.57	3.0<	0.005<
2010	920414	916	0.5	11	00042902	0.001<	0.0005<	0.057	0.002<	0.55	3.0<	0.005<
2010	920415	1441	0.5	11	00042912	0.001<	0.0010	0.097	0.002<	0.58	3.0<	0.008
2010	920622	1243	0.5	11	00040803	0.001<	0.0005<	0.048	0.002<	1.00	3.0<	0.018
2010	920623	905	0.5	11	00040816	0.001<	0.0005<	0.020<	0.002<	0.30	3.0<	0.005<
2010	920624	926	0.5	11	00040823	0.001<	0.0010	0.020<	0.002<	0.30	3.0<	0.005<
2010	920625	940	0.5	11	00040839	0.001<	0.0010	0.020<	0.002<	0.30	3.0<	0.005<
2010	921117	825	0.5	11	00044829	0.001<	0.0010	0.082	0.002<	0.49	3.0<	0.005<
2010	921117	915	0.5	11	00443838	0.001<	0.0010	0.079	0.002<	0.50	NO DATA	NO DATA
2010	921118	830	0.5	11	00044842	0.001<	0.0020	0.049	0.002<	0.41	3.0<	0.012
2010	921119	840	0.5	11	00044852	0.001<	0.0010	0.027	0.002<	0.50	3.0<	0.015
2011	920413	1143	0.5	11	00042892	0.001<	0.0010	0.120	0.002<	0.54	3.0<	0.005<
2011	920414	909	0.5	11	00042901	0.001<	0.0010	0.063	0.002<	0.56	3.0<	0.005<
2011	920415	1438	0.5	11	00042911	0.001<	0.0010	0.160	0.002<	1.10	3.0<	0.005<
2011	920622	1227	0.5	11	00040801	0.001<	0.0005<	0.020<	0.002<	0.30	3.0<	0.005<
2011	920624	915	0.5	11	00040821	0.001<	0.0010	0.089	0.002<	0.60	3.0<	0.005<
2011	920625	927	0.5	11	00040837	0.001<	0.0020	0.020<	0.002<	0.60	3.0<	0.007
2011	921117	830	0.5	11	00044830	0.001<	0.0010	0.110	0.002<	0.53	3.0	0.032
2011	921117	920	0.5	11	00044839	0.001<	0.0010	0.110	0.002<	0.54	NO DATA	NO DATA
2011	921118	835	0.5	11	00044843	0.001<	0.0010	0.088	0.002<	0.57	3.0<	0.005<
2011	921119	845	0.5	11	00044853	0.001<	0.0010	0.050	0.002<	0.52	3.0<	0.005<
2012	920413	1102	0.5	11	00042885	0.001<	0.0010	0.250	0.002<	5.50	7.8	0.007
2012	920414	839	0.5	11	00042895	0.001<	0.0005<	0.180	0.002<	6.20	8.2	0.015
2012	920415	1417	0.5	11	00042905	0.001<	0.0010	0.210	0.002<	13.00	6.7	0.016
2012	920416	1000	0.5	11	00042915	0.001<	0.0005<	0.330	0.002<	2.30	3.0<	0.005<
2012	920622	1251	0.5	11	00040804	0.001<	0.0005<	0.100	0.002<	1.10	3.0	0.018
2012	920623	857	0.5	11	00040815	0.003	0.0005<	0.170	0.002<	4.90	5.0	0.017
2012	920624	932	0.5	11	00040824	0.002	0.0010	0.120	0.002<	2.80	3.0<	0.005<
2012	921116	1415	0.5	11	00044821	0.001<	0.0010	0.170	0.002<	0.78	3.0<	0.005<
2012	921118	840	0.5	11	00044844	0.001<	0.0010	0.140	0.002<	2.70	3.0<	0.036

STN #	DATE YYMMDD	TIME	SAMPLE DEPTH (m.)	SMP TYPE	FIELD SAMPLE NUMBER	ARSENIC MG/L as As	COPPER MG/L as Cu	IRON MG/L as Fe	NICKEL MG/L as Ni	TOTAL URANIUM UG/L as U	DISS. URANIUM UG/L	RADIUM 226 BQ/L
2013	920413	1115	0.5	11	00042886	0.002	0.0020	0.360	0.002<	36.00	37.0	0.025
2013	920414	846	0.5	11	00042896	0.001<	0.0020	0.360	0.002<	38.00	37.0	0.028
2013	920415	1421	0.5	11	00042906	0.002	0.0010	0.330	0.002<	38.00	39.0	0.032
2013	920416	1007	0.5	11	00042916	0.003	0.0030	0.470	0.002<	39.00	38.0	0.005<
2013	920622	1300	0.5	11	00040805	0.007	0.0010	0.540	0.002<	10.00	9.0	0.033
2013	920623	851	0.5	11	00040814	0.005	0.0005<	0.300	0.002<	8.50	10.0	0.033
2013	920625	900	0.5	11	00040832	0.005	0.0020	0.380	0.002<	12.00	4.0	0.034
2013	921116	1420	0.5	11	00044822	0.003	0.0030	0.400	0.002<	24.00	24.0	0.044
2013	921117	840	0.5	11	00044833	0.003	0.0040	0.480	0.002<	34.00	34.0	0.042
2013	921118	845	0.5	11	00044845	0.003	0.0030	0.350	0.002<	33.00	29.0	0.037
2013	921119	855	0.5	11	00044856	0.003	0.0030	0.270	0.002<	27.00	30.0	0.034
2014	920413	1120	0.5	11	00042887	0.002	0.0010	0.410	0.002<	38.00	38.0	0.005<
2014	920413	1125	0.5	11	00042888	0.002	0.0020	0.380	0.002<	37.00	NO DATA	NO DATA
2014	920415	1425	0.5	11	00042907	0.002	0.0010	0.350	0.002<	37.00	38.0	0.026
2014	920416	1009	0.5	11	00042917	0.004	0.0030	0.570	0.002<	45.00	48.0	0.041
2014	920622	1304	0.5	11	00040806	0.007	0.0010	0.420	0.002<	10.00	11.0	0.052
2014	920623	847	0.5	11	00040813	0.005	0.0005<	0.260	0.002<	9.90	11.0	0.046
2014	920624	855	0.5	11	00040831	0.004	0.0020	0.310	0.002<	12.00	8.0	0.029
2014	920624	945	0.5	11	00040827	0.004	0.0020	0.230	0.002<	8.00	NO DATA	NO DATA
2014	921117	845	0.5	11	00044834	0.004	0.0030	0.490	0.002<	38.00	35.0	0.052
2014	921118	850	0.5	11	00044846	0.003	0.0030	0.340	0.002<	32.00	31.0	0.040
2014	921119	900	0.5	11	00044857	0.003	0.0020	0.250	0.002<	32.00	30.0	0.037
2015	920414	857	0.5	11	00042899	0.002	0.0020	0.410	0.002<	38.00	39.0	0.027
2015	920415	1428	0.5	11	00042908	0.002	0.0020	0.430	0.002<	37.00	40.0	0.025
2015	920622	1310	0.5	11	00040807	0.006	0.0005<	0.380	0.003	7.50	8.0	0.038
2015	920623	840	0.5	11	00040812	0.004	0.0010	0.400	0.002<	9.60	10.0	0.029
2015	920624	950	0.5	11	00040828	0.004	0.0010	0.200	0.002<	7.40	7.0	0.006
2015	920625	910	0.5	11	00040834	0.004	0.0020	0.290	0.002<	11.00	4.0	0.033
2015	921116	1430	0.5	11	00044825	0.003	0.0080	0.340	0.002<	26.00	24.0	0.040
2015	921117	848	0.5	11	00044835	0.004	0.0040	0.430	0.002<	33.00	35.0	0.051
2015	921119	905	0.5	11	00044858	0.003	0.0020	0.260	0.002<	33.00	31.0	0.062
2016	920413	1129	0.5	11	00042889	0.002	0.0020	0.380	0.002<	38.00	35.0	0.021
2016	920414	902	0.5	11	00042900	0.002	0.0010	0.540	0.002<	38.00	NO DATA	NO DATA
2016	920416	1018	0.5	11	00042920	0.003	0.0020	0.490	0.002<	38.00	40.0	0.030
2016	920623	2016	0.5	11	00040811	0.004	0.0005<	0.280	0.002<	8.00	9.0	0.037
2016	920624	955	0.5	11	00040829	0.004	0.0020	0.200	0.002<	7.00	7.0	0.023
2016	920625	905	0.5	11	00040833	0.004	0.0020	0.310	0.002<	12.00	4.0	0.030
2016	921116	1435	0.5	11	00044826	0.004	0.0030	0.390	0.002<	25.00	31.0	0.042
2016	921117	850	0.5	11	00044836	0.004	0.0030	0.420	0.002<	31.00	32.0	0.066
2016	921118	900	0.5	11	00044849	0.003	0.0020	0.340	0.002<	30.00	33.0	0.052
2016	921119	910	0.5	11	00044859	0.002	0.0020	0.260	0.002<	32.00	31.0	0.040